SAF-RC-032
100-F Remaining Sites Burial Grounds - Soil Full Protocol
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jeanette Duncan (3) H9-02 JJE 6/14/06
INITIAL/DATE

COMMENTS:

SDG K0262 **SAF-RC-032**

Waste Site: 1607-F-3 / 1607-F-5

Date: 6 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Sites 1607-F-3
Subject: Volatile Organics - Data Package No. K0262-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0262 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
J11L17	3/20/06	Soil	C	VOAs by 8260B

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be analyzed within 14 days of the date of sample collection. If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

· **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

Due to method blank contamination, the methylene chloride result was qualified as undetected, raised to the RQL and flagged "U".

All other method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

· **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

All accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

Field Duplicate Samples

No field blanks were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. Seven analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data package No. K0262 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to method blank contamination, the methylene chloride result was qualified as undetected, raised to the RQL and flagged "U". Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Seven analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

REFERENCES

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

VOLATILE ORGANIC DATA QUALIFICATION SUMMARY*

SDG: KQ262	REVIEWER: TH	Project: T607-P3	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Methylene chloride	U at RQL	All	Blank contamination

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

VOLATILE ORGANIC ANALYSIS, SOIL MATRIX (UG/KG)

Project: WASHINGTON CLOSURE HANFORD			
Laboratory: LLI			
Case:	SDG: K0262		
Sample Number		J11L17	
Remarks			
Sample Date		3/20/06	
Analysis Date		4/2/06	
VOA	RQL	Result	Q
Chloromethane	10	12	U
Bromomethane	10	12	U
Vinyl Chloride	10	12	U
Chloroethane	10	12	U
Methylene Chloride	10	10	U
Acetone	10	5	
Carbon Disulfide	10	6	U
1,1-Dichloroethene	10	6	U
1,1-Dichloroethane	10	6	U
1,2-Dichloroethene (total)	10	6	U
Chloroform	10	1	
1,2-Dichloroethane	10	6	U
2-Butanone	10	12	U
1,1,1-Trichloroethane	10	6	U
Carbon Tetrachloride	10	6	U
Bromodichloromethane	10	6	U
1,2-Dichloropropane	10	6	U
cis-1,3-Dichloropropene	10	6	U
Trichloroethene	10	6	U
Dibromochloromethane	10	6	U
1,1,2-Trichloroethane	10	6	U
Benzene	10	6	U
trans-1,3-Dichloropropene	10	6	U
Bromoform	10	6	U
4-Methyl-2-pentanone	10	12	U
2-Hexanone	10	12	U
Tetrachloroethene	10	6	U
1,1,2,2-Tetrachloroethane	10	6	U
Toluene	10	6	U
Chlorobenzene	10	6	U
Ethylbenzene	10	6	U
Styrene	10	6	U
Xylene	10	6	U
cis-1,2-Dichloroethene	10	6	U
trans-1,2-Dichloroethene	10	6	U

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize mis-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory, Inc.
Volatiles by GC/MS, HSL List
Report Date: 04/06/06 09:42

RFW Batch Number: 0603L573 Client: TNUHANFORD RC-032 K0262 Work Order: 11343606001 Page: 1a

	Cust ID:	J11L17	J11L17	J11L17	VBLKVE	VBLKVE BS
Sample Information	RFW#:	001	001 MS	001 MSD	06LVK050-MB1	06LVK050-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.11	1.04	1.04	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Toluene-d8	121 %	113 %	113 %	112 %	111 %
	Bromofluorobenzene	131 * %	132 * %	93 %	122 %	116 %
	1,2-Dichloroethane-d4	122 %	125 %	126 %	121 %	132 %
Chloromethane		12 U	102 %	95 %	10 U	94 %
Bromomethane		12 U	134 %	129 %	10 U	129 %
Vinyl Chloride		12 U	106 %	102 %	10 U	86 %
Chloroethane		12 U	120 %	118 %	10 U	99 %
Methylene Chloride		10 ~~6~~ BU	75 %	76 %	5 J	67 %
Acetone		5 J	195 %	209 %	10 U	133 %
Carbon Disulfide		6 U	115 %	112 %	5 U	103 %
1,1-Dichloroethene		6 U	115 %	114 %	5 U	100 %
1,1-Dichloroethane		6 U	115 %	116 %	5 U	105 %
1,2-Dichloroethene (total)		6 U	106 %	105 %	5 U	95 %
Chloroform		1 J	102 %	104 %	5 U	97 %
1,2-Dichloroethane		6 U	126 %	130 %	5 U	120 %
2-Butanone		12 U	141 %	159 %	10 U	118 %
1,1,1-Trichloroethane		6 U	129 %	133 %	5 U	124 %
Carbon Tetrachloride		6 U	134 %	138 %	5 U	130 %
Bromodichloromethane		6 U	120 %	123 %	5 U	113 %
1,2-Dichloropropane		6 U	111 %	111 %	5 U	102 %
cis-1,3-Dichloropropene		6 U	113 %	112 %	5 U	103 %
Trichloroethene		6 U	116 %	118 %	5 U	107 %
Dibromochloromethane		6 U	125 %	130 %	5 U	116 %
1,1,2-Trichloroethane		6 U	113 %	114 %	5 U	99 %
Benzene		6 U	110 %	111 %	5 U	100 %
Trans-1,3-Dichloropropene		6 U	118 %	116 %	5 U	105 %
Bromoform		6 U	120 %	119 %	5 U	112 %
4-Methyl-2-pentanone		12 U	108 %	112 %	10 U	91 %
2-Hexanone		12 U	120 %	111 %	2 J	93 %
Tetrachloroethene		6 U	118 %	123 %	5 U	108 %
1,1,2,2-Tetrachloroethane		6 U	129 %	133 * %	5 U	104 %
Toluene		6 U	111 %	112 %	5 U	99 %

*= Outside of EPA CLP QC limits.

000012

4/4/06

RFW Batch Number: 0603L573 Client: TNUHANFORD RC-032 K0262 Work Order: 11343606001 Page: 1b

	Cust ID:	J11L17	J11L17	J11L17	VBLKVE	VBLKVE BS
	RFW#:	001	001 MS	001 MSD	06LVK050-MB1	06LVK050-MB1
Chlorobenzene		6 U	103 %	105 %	5 U	97 %
Ethylbenzene		6 U	105 %	108 %	5 U	96 %
Styrene		6 U	98 %	100 %	5 U	94 %
Xylene (total)		6 U	101 %	105 %	5 U	95 %
cis-1,2-dichloroethene		6 U	105 %	104 %	5 U	95 %
trans-1,2-dichloroethene		6 U	107 %	106 %	5 U	95 %

*= Outside of EPA CLP QC limits.

000013

6/14/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-032
LVL #: 0603L573
SDG/SAF # K0262/RC-032

W.O. #: 11343-606-001-9999-00
Date Received: 03-22-2006

GC/MS VOLATILE

One (1) soil sample was collected on 03-20-2006.

The sample and its associated QC samples were analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8260B for TCL volatile target compounds on 04-02-2006.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from a sample that met LvLI's sample acceptance policy.

2. The sample was analyzed within required holding time.

3. Non-target compounds were detected in the sample.

4. Two (2) of fifteen (15) surrogate recoveries were outside acceptance criteria. The analysis of associated matrix spike samples fulfills the reanalysis requirement of sample J11L17.

5. One (1) of seventy (70) matrix spike recoveries was outside acceptance criteria.

6. All blank spike recoveries were within acceptance criteria.

7. The method blank contained the common laboratory contaminant Methylene Chloride at levels less than 2x the CRQL. The method blank also contained the target compound 2-Hexanone at a level less than the CRQL.

8. Internal standard area and retention time criteria were met.

208 Welsh Pool Road • Exton, PA 19341- 1313 • (610) 280-3000 • Fax (610) 280-3041

9. Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

10. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.

11. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

4/11/06
Date

som\group\data\voa\tnu-hanford\0603-573.doc

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-027	Page 1 of 1

Collector Coffman	**Company Contact** R.T. Coffman	**Telephone No.** 528-6409	**Project Coordinator** KESSNER, JH	**Price Code** 8K	**Data Turnaround**
Project Designation 100-F Remaining Sites Burial Grounds - Soil Full Protocol	**Sampling Location** 1607-F-3 Stock pile Area Verification		**SAF No.** RC-032	**Air Quality** ☐	15 DAY
Ice Chest No. ERC-99-062	**Field Logbook No.** EFL-1174-1	COA 3 R607F52000 RTC 3/16/06	**Method of Shipment** Fed Ex		
Shipped To EBERLINE SERVICES LIONVILLE	**Offsite Property No.** A060338		**Bill of Lading/Air Bill No.** SEE OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

L.D.O.T. Limits

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None				
Type of Container	aG	aG	aG	aG	aG	G/P				
No. of Container(s)	1	1	1	1	1	1				
Volume	250g	60mL	120mL	120mL	125mL	500mL				
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081	See item (2) in Special Instructions. RTC 3/20/06				
Sample No.	**Matrix ***	**Sample Date**	**Sample Time**							
J11L17	SOIL	3/20/06	1230	X	X	X	X	X	X	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time 1500	Received By/Stored In	Date/Time 1500
RT COFFMAN / RT Coffman	3/20/06	ROOM 2A, 3728,	3/20/06
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time 0900
3728 # 2A 3-21-06	0900	T.R. Edmundson	3-21-06
Relinquished By/Removed From WCH	Date/Time 1600	Received By/Stored In	Date/Time
T.R. Edmundson	3-21-06	FED EX	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Fed Ex	3-22-06 0920		3-22-06 0920
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010 (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7470 - (CV)
(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Silver-108 metastable}

Personnel not available to relinquish samples from 3728 Ref # 2A on 3/21/06

Matrix *

S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

000017

0056812

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: ~~1607-F3~~ 1607-F-5			DATA PACKAGE: K0262		
VALIDATOR: TLI		LAB: LLI		DATE: 6/2/00	
			SDG: K0262		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J11L17 ~~J11L18~~ 6/2/00					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: _____

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No (N/A)

Initial calibrations acceptable? ..... Yes No (N/A)

Continuing calibrations acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Calculation check acceptable? ..... Yes No (N/A)

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes	No	N/A
Calibration blank results acceptable? (Levels D, E)	Yes	No	N/A
Laboratory blanks analyzed?	Yes	No	N/A
Laboratory blank results acceptable?	Yes	No	N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes	No	N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments: Mc – U at RQL no FB

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes	No	N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes	No	N/A
Surrogates traceable? (Levels D, E)	Yes	No	N/A
Surrogates expired? (Levels D, E)	Yes	No	N/A
MS/MSD samples analyzed?	Yes	No	N/A
MS/MSD results acceptable?	Yes	No	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	N/A
MS/MSD standards? (Levels D, E)	Yes	No	N/A
LCS/BSS samples analyzed?	Yes	No	N/A
LCS/BSS results acceptable?	Yes	No	N/A
Standards traceable? (Levels D, E)	Yes	No	N/A
Standards expired? (Levels D, E)	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A
Performance audit sample(s) analyzed?	Yes	No	N/A
Performance audit sample results acceptable?	Yes	No	N/A

Comments: no PAS

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A
MS/MSD RPD values acceptable? ..... Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A
MS/MSD standards expired? (Levels D, E) ..... Yes No N/A
Field duplicate RPD values acceptable? ..... Yes No N/A
Field split RPD values acceptable? ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments:_____

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No N/A
Iinternal standard areas acceptable? ..... Yes No N/A
Internal standard retention times acceptable? ..... Yes No N/A
Standards traceable? ..... Yes No N/A
Standards expired? ..... Yes No N/A
Transcription/calculation errors? ..... Yes No N/A

Comments:_____

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A
Sample holding times acceptable? ..... Yes No N/A

Comments:_____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No N/A
Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A
Results reported for all requested analyses? ..... Yes No N/A
Results supported in the raw data? (Levels D, E) ..... Yes No N/A
Samples properly prepared? (Levels D, E) ..... Yes No N/A
Laboratory properly identified and coded all TIC? (Levels D, E) ..... Yes No N/A
Detection limits meet RDL? ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: T orea

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed? ..... Yes No N/A
GPC check performed? ..... Yes No N/A
GPC check recoveries acceptable? ..... Yes No N/A
GPC calibration performed? ..... Yes No N/A
GPC calibration check performed? ..... Yes No N/A
GPC calibration check retention times acceptable? ..... Yes No N/A
Check/calibration materials traceable? ..... Yes No N/A
Check/calibration materials Expired? ..... Yes No N/A
Analytical batch QC given similar cleanup? ..... Yes No N/A
Transcription/Calculation Errors? ..... Yes No N/A

Comments:

Date: 6 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Site 1607-F-3/1607-F-5
Subject: Semivolatile - Data Package No. K0262-LLI

INTRODUCTION

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J11L18	3/20/06	Soil	C	See note 1

1 – Semivolatiles by 8270C.

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If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two

times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

Due to method blank contamination, all bis(2-ethylhexyl)phthalate results were raised to the RQL, qualified as undetected and flagged "U".

All other method blank results were acceptable.

Field Blanks

No equipment blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the

spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

All accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. Sixteen analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data package No. K0262 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to method blank contamination, all bis(2-ethylhexyl)phthalate results were raised to the RQL, qualified as undetected and flagged "U".

Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods

Sixteen analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

REFERENCES

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

SEMIVOLATILE ORGANIC DATA QUALIFICATION SUMMARY*

SDG: K0262	REVIEWER: Project: 1607-F-5 TLI, [illegible] 1607-F-3		PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Bis(2-ethylhexyl)phthalate	U at RQL	All	Blank contamination

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG)

Project: WASHINGTON CLOSURE HANFORD													
Laboratory: LLI	SDG: K0262												
Sample Number		J11L17		J11L18				Sample Number		J11L17		J11L18	
Remarks								Remarks					
Sample Date		3/20/06		3/20/06				Sample Date		3/20/06		3/20/06	
Extraction Date		3/27/06		3/27/06				Extraction Date		3/27/06		3/27/06	
Analysis Date		3/30/06		4/5/06				Analysis Date		3/30/06		4/5/06	
Semivolatile (8270C)	RQL	Result	Q	Result	Q	Result	Q	Semivolatile (8270C)	RQL	Result	Q	Result	Q
Phenol	660	350	U	350	U			3-Nitroaniline*	660	870	U	880	U
bis(2-Chloroethyl)ether	660	350	U	350	U			Acenaphthene	660	350	U	350	U
2-Chlorophenol	660	350	U	350	U			2,4-Dinitrophenol*	660	870	U	880	U
1,3-Dichlorobenzene	660	350	U	350	U			4-Nitrophenol*	660	870	U	880	U
1,4-Dichlorobenzene	660	350	U	350	U			Dibenzofuran	660	350	U	350	U
1,2-Dichlorobenzene	660	350	U	350	U			2,4-Dinitrotoluene	660	350	U	350	U
2-Methylphenol	660	350	U	350	U			Diethylphthalate	660	350	U	350	U
2,2'-oxybis(1-chloropropane)	660	350	U	350	U			4-Chlorophenyl-phenyl ether	660	350	U	350	U
3 and/or 4-Methylphenol	660	350	U	350	U			Fluorene	660	350	U	350	U
N-Nitroso-di-n-propylamine	660	350	U	350	U			4-Nitroaniline*	660	870	U	880	U
Hexachloroethane	660	350	U	350	U			4,6-Dinitro-2-methylphenol*	660	870	U	880	U
Nitrobenzene	660	350	U	350	U			N-Nitrosodiphenylamine	660	350	U	350	U
Isophorone	660	350	U	350	U			4-Bromophenyl-phenyl ether	660	350	U	350	U
2-Nitrophenol	660	350	U	350	U			Hexachlorobenzene	660	350	U	350	U
2,4-Dimethylphenol	660	350	U	350	U			Pentachlorophenol*	660	870	U	880	U
bis(2-Chloroethoxy)methane	660	350	U	350	U			Phenanthrene	660	350	U	350	U
2,4-Dichlorophenol	660	350	U	350	U			Anthracene	660	350	U	350	U
1,2,4-Trichlorobenzene	660	350	U	350	U			Carbazole	660	350	U	350	U
Naphthalene	660	350	U	350	U			Di-n-butylphthalate	660	120		350	U
4-Chloroaniline	660	350	U	350	U			Fluoranthene	660	350	U	350	U
Hexachlorobutadiene	660	350	U	350	U			Pyrene	660	350	U	350	U
4-Chloro-3-methylphenol	660	350	U	350	U			Butylbenzylphthalate	660	350	U	350	U
2-Methylnaphthalene	660	350	U	350	U			3,3'-Dichlorobenzidine	660	350	U	350	U
Hexachlorocyclopentadiene	660	350	U	350	U			Benzo(a)anthracene	660	350	U	350	U
2,4,6-Trichlorophenol	660	350	U	350	U			Chrysene	660	350	U	350	U
2,4,5-Trichlorophenol*	660	870	U	880	U			bis(2-Ethylhexyl)phthalate	660	660	U	660	U
2-Chloronaphthalene	660	350	U	350	U			Di-n-octylphthalate	660	350	U	350	U
2-Nitroaniline*	660	870	U	880	U			Benzo(b)fluoranthene	660	350	U	350	U
Dimethylphthalate	660	350	U	350	U			Benzo(k)fluoranthene	660	350	U	350	U
Acenaphthylene	660	350	U	350	U			Benzo(a)pyrene	660	350	U	350	U
2,6-Dinitrotoluene	660	350	U	350	U			Indeno(1,2,3-cd)pyrene	660	350	U	350	U
								Dibenz(a,h)anthracene	660	350	U	350	U
								Benzo(g,h,i)perylene	660	350	U	350	U

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results.

All other qualifiers shown were applied during validation.

* - RQL exceeded

	Cust ID:	J11L17	J11L18	J11L18	J11L18	SBLKVJ	SBLKVJ BS
Sample Information	RFW#:	001	002	002 MS	002 MSD	06LE0233-MB1	06LE0233-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	Nitrobenzene-d5	56 %	53 %	72 %	70 %	68 %	68 %
Surrogate Recovery	2-Fluorobiphenyl	62 %	62 %	80 %	90 %	64 %	74 %
	Terphenyl-d14	88 %	95 %	80 %	75 %	90 %	82 %
	Phenol-d5	62 %	60 %	78 %	75 %	65 %	75 %
	2-Fluorophenol	55 %	54 %	65 %	62 %	64 %	68 %
	2,4,6-Tribromophenol	67 %	92 %	94 %	94 %	76 %	107 %
Phenol		350 U	350 U	82 %	78 %	330 U	84 %
bis(2-Chloroethyl)ether		350 U	350 U	77 %	70 %	330 U	82 %
2-Chlorophenol		350 U	350 U	78 %	74 %	330 U	85 %
1,3-Dichlorobenzene		350 U	350 U	58 %	62 %	330 U	79 %
1,4-Dichlorobenzene		350 U	350 U	59 %	62 %	330 U	79 %
1,2-Dichlorobenzene		350 U	350 U	66 %	65 %	330 U	96 %
2-Methylphenol		350 U	350 U	84 %	79 %	330 U	78 %
2,2'-oxybis(1-Chloropropane)		350 U	350 U	75 %	69 %	330 U	75 %
4-Methylphenol		350 U	350 U	86 %	84 %	330 U	88 %
N-Nitroso-di-n-propylamine		350 U	350 U	85 %	80 %	330 U	87 %
Hexachloroethane		350 U	350 U	58 %	60 %	330 U	79 %
Nitrobenzene		350 U	350 U	75 %	72 %	330 U	72 %
Isophorone		350 U	350 U	89 %	85 %	330 U	84 %
2-Nitrophenol		350 U	350 U	79 %	78 %	330 U	76 %
2,4-Dimethylphenol		350 U	350 U	74 %	77 %	330 U	66 %
bis(2-Chloroethoxy)methane		350 U	350 U	81 %	77 %	330 U	74 %
2,4-Dichlorophenol		350 U	350 U	85 %	84 %	330 U	77 %
1,2,4-Trichlorobenzene		350 U	350 U	71 %	71 %	330 U	77 %
Naphthalene		350 U	350 U	77 %	74 %	330 U	81 %
4-Chloroaniline		350 U	350 U	129 * %	130 * %	330 U	100 %
Hexachlorobutadiene		350 U	350 U	74 %	75 %	330 U	88 %
4-Chloro-3-methylphenol		350 U	350 U	92 %	86 %	330 U	89 %
2-Methylnaphthalene		350 U	350 U	84 %	80 %	330 U	89 %
Hexachlorocyclopentadiene		350 U	350 U	54 %	64 %	330 U	68 %
2,4,6-Trichlorophenol		350 U	350 U	98 %	105 %	330 U	98 %
2,4,5-Trichlorophenol		870 U	880 U	93 %	100 %	830 U	83 %

*= Outside of EPA CLP QC limits.

R 4/4/06

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Cust ID:	J11L17		J11L18		J11L18		J11L18		SBLKVJ		SBLKVJ BS	
RFW#:	001		002		002 MS		002 MSD		06LE0233-MB1		06LE0233-MB1	
2-Chloronaphthalene	350	U	350	U	86	%	92	%	330	U	83	%
2-Nitroaniline	870	U	880	U	97	%	97	%	830	U	85	%
Dimethylphthalate	350	U	350	U	82	%	86	%	330	U	83	%
Acenaphthylene	350	U	350	U	87	%	89	%	330	U	87	%
2,6-Dinitrotoluene	350	U	350	U	90	%	92	%	330	U	80	%
3-Nitroaniline	870	U	880	U	126	%	127	%	830	U	108	%
Acenaphthene	350	U	350	U	87	%	88	%	330	U	90	%
2,4-Dinitrophenol	870	U	880	U	91	%	83	%	830	U	48	%
4-Nitrophenol	870	U	880	U	103	%	95	%	830	U	84	%
Dibenzofuran	350	U	350	U	85	%	86	%	330	U	94	%
2,4-Dinitrotoluene	350	U	350	U	95	%	95	%	330	U	98	%
Diethylphthalate	350	U	350	U	85	%	83	%	330	U	87	%
4-Chlorophenyl-phenylether	350	U	350	U	86	%	86	%	330	U	90	%
Fluorene	350	U	350	U	88	%	88	%	330	U	86	%
4-Nitroaniline	870	U	880	U	114	%	107	%	830	U	95	%
4,6-Dinitro-2-methylphenol	870	U	880	U	112	%	103	%	830	U	84	%
N-Nitrosodiphenylamine (1)	350	U	350	U	75	%	72	%	330	U	74	%
4-Bromophenyl-phenylether	350	U	350	U	80	%	77	%	330	U	81	%
Hexachlorobenzene	350	U	350	U	98	%	93	%	330	U	125	%
Pentachlorophenol	870	U	880	U	115	%	110	%	830	U	109	%
Phenanthrene	350	U	350	U	104	%	101	%	330	U	100	%
Anthracene	350	U	350	U	103	%	96	%	330	U	102	%
Carbazole	350	U	350	U	111	%	102	%	330	U	94	%
Di-n-butylphthalate	120	J	350	U	105	%	98	%	330	U	98	%
Fluoranthene	350	U	350	U	125	%	116	%	330	U	107	%
Pyrene	350	U	350	U	85	%	80	%	330	U	96	%
Butylbenzylphthalate	350	U	350	U	91	%	84	%	330	U	89	%
3,3'-Dichlorobenzidine	350	U	350	U	95	%	134	%	330	U	116	%
Benzo(a)anthracene	350	U	350	U	98	%	94	%	330	U	91	%
Chrysene	350	U	350	U	97	%	88	%	330	U	89	%
bis(2-Ethylhexyl)phthalate	660 ~~82~~	~~JB~~ U	660 ~~75~~	~~JB~~ U	90	%	87	%	54	J	89	%
Di-n-octyl phthalate	350	U	350	U	100	%	96	%	330	U	88	%
Benzo(b)fluoranthene	350	U	350	U	114	%	95	%	330	U	95	%
Benzo(k)fluoranthene	350	U	350	U	95	%	95	%	330	U	88	%
Benzo(a)pyrene	350	U	350	U	100	%	92	%	330	U	87	%
Indeno(1,2,3-cd)pyrene	350	U	350	U	110	%	101	%	330	U	91	%
Dibenz(a,h)anthracene	350	U	350	U	112	%	104	%	330	U	91	%
Benzo(g,h,i)perylene	350	U	350	U	105	%	97	%	330	U	87	%

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

6/4/06

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-032
LVL #: 0603L573
SDG/SAF # K0262/RC-032

W.O. #: 11343-606-001-9999-00
Date Received: 03-22-2006

SEMIVOLATILE

Two (2) soil samples were collected on 03-20-2006.

The samples and their associated QC samples were extracted according to Lionville Laboratory SOPs based on SW 846 method 3540C on 03-27-2006 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 03-29,30-2006 and 04-05-2006.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.

2. Samples were extracted and analyzed within required holding time.

3. Non-target compounds were detected in the samples.

4. All surrogate recoveries were within acceptance criteria.

5. Two (2) of one hundred twenty-eight (128) matrix spike recoveries were outside acceptance criteria.

6. All blank spike recoveries were within acceptance criteria.

7. The method blank contained the common laboratory contaminant Bis (2-Ethylhexyl) phthalate at a level less than the CRQL.

8. Internal standard area and retention time criteria were met.

9. Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

208 Welsh Pool Road • Exton, PA 19341- 1313 • (610) 280-3000 • Fax (610) 280-3041

LvLI
LIONVILLE LABORATORY INC.

10. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.

11. I certify, that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data, contained in this hard-copy data package, has been authorized, by the Laboratory Manager or a designee, as verified by the following signature.

for Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

4/10/06
Date

soun\gorup\data\bna\tnu-hanford\0603-573.doc

208 Welsh Pool Road • Exton, PA 19341- 1313 • (610) 280-3000 • Fax (610) 280-3041

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-032-027	Page 1 of 1
Collector Coffman	Company Contact R.T. Coffman	Telephone No. 528-6409	Project Coordinator KESSNER, JH	Price Code 8K Air Quality ☐	Data Turnaround 15 DAY
Project Designation 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location 1607-F-3 Stock pile Area Verification		SAF No. RC-032		
Ice Chest No. ERC-99-062	Field Logbook No. EFL-1174-1	COA 3 RTC 3/14/06 R607F52000	Method of Shipment Fed Ex		
Shipped To EBERLINE SERVICES LIONVILLE	Offsite Property No. A060338		Bill of Lading/Air Bill No. SEE OSA		

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

L.D.O.T. Limits

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None				
Type of Container	aG	aG	aG	aG	aG	G/P				
No. of Container(s)	1	1	1	1	1	1				
Volume	250g	60mL	120mL	120mL	125mL	500mL				
SAMPLE ANALYSIS	See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081	See item (2) in Special Instructions. RTC 3/20/06				
Sample No.	Matrix *	Sample Date	Sample Time							
J11L17	SOIL	3/20/06	1230	X	X	X	X	X	X	

910016

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By/Removed From RT COFFMAN / RT Coffman 3/20/06	Date/Time 1500	Received By/Stored In ROGER F2A, 3728, 3/20/06	Date/Time 1500
Relinquished By/Removed From 3728 #2A 3-21-06	Date/Time 0900	Received By/Stored In T.R. Edmundson T.R. Edmundson 3-21-06	Date/Time 0900
Relinquished By/Removed From T.R. Edmundson T.R. Edmundson 3-21-06	Date/Time 1200	Received By/Stored In FED EX	Date/Time
Relinquished By/Removed From Fed Ex 3-22-06	Date/Time 0920	Received By/Stored In [signature] 3-22-06	Date/Time 0920
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010 (Client List) [Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc]; Mercury - 7470 - (CV)
(2) Gamma Spectroscopy (TCL List) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]; Gamma Spec - Add-on [Silver-108 metastable]

Personnel not available to relinquish samples from 3728 Ref# 2A on 3/21/06

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquid
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-032-028	Page 1 of 1
Collector Coffman	Company Contact R.T. Coffman	Telephone No. 528-6409	Project Coordinator KESSNER, JH	Price Code 8K Air Quality ☐	Data Turnaround 15 Day
Project Designation 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location 1607-F-5 Stock pile Area Verification		SAF No. RC-032		
Ice Chest No. ERC-99-062	Field Logbook No. EFL-1174-1	COA R607F52000	Method of Shipment Fed Ex		
Shipped To EBERLINE SERVICES / LIONVILLE	Offsite Property No. A060338		Bill of Lading/Air Bill No. SEE OSPC		

0000017

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

< D.O.T. Limits

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	Cool 4C	Cool 4C							
Type of Container	aG	aG	aG	aG							
No. of Container(s)	1	1	1	1							
Volume	250g	60mL	120mL	125mL							
SAMPLE ANALYSIS	See Item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)	Pesticides - 8081							
Sample No.	Matrix *	Sample Date	Sample Time								
J11L18	SOIL	3/20/06	1100	X	X	X	X				

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R COFFMAN / RTCoffman	3/24/06 1500	Refer to 2A, 3228	3/24/00 1500
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
3728 #2A	3-21-06 0900	TR. Edmundson TREdmundson	3-21-06 0900
Relinquished By/Removed From WCH	Date/Time 1500	Received By/Stored In	Date/Time
T.R. Edmundson TREdmundson	3-21-06	FED EX	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
FedEx	3-22-06 0920	V. Newman	3-22-06 0920
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010 (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7470 - (CV)

Relinquish samples from 3728
Ref # 2A on 3 21 06

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 1607-F-3 / 1607-F-5			DATA PACKAGE: K0262		
VALIDATOR: TCP		LAB: LCT		DATE: 6/2/06	
			SDG: K0262		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
J1L17 J1L18					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: _____

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No (N/A)

Initial calibrations acceptable? ..... Yes No (N/A)

Continuing calibrations acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Calculation check acceptable? ..... Yes No (N/A)

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A
Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A
Laboratory blanks analyzed? ..... Yes No N/A
Laboratory blank results acceptable? ..... Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: no EB
bis(2-ethylhexyl)phthalate - used RQL

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? ..... Yes No N/A
Surrogate/system monitoring compound recoveries acceptable? ..... Yes No N/A
Surrogates traceable? (Levels D, E) ..... Yes No N/A
Surrogates expired? (Levels D, E) ..... Yes No N/A
MS/MSD samples analyzed? ..... Yes No N/A
MS/MSD results acceptable? ..... Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A
MS/MSD standards? (Levels D, E) ..... Yes No N/A
LCS/BSS samples analyzed? ..... Yes No N/A
LCS/BSS results acceptable? ..... Yes No N/A
Standards traceable? (Levels D, E) ..... Yes No N/A
Standards expired? (Levels D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A
Performance audit sample(s) analyzed? ..... Yes No N/A
Performance audit sample results acceptable? ..... Yes No N/A

Comments: no PAS

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... Yes No N/A
MS/MSD RPD values acceptable? ..... Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No N/A
MS/MSD standards expired? (Levels D, E) ..... Yes No N/A
Field duplicate RPD values acceptable? ..... Yes No N/A
Field split RPD values acceptable? ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A
Comments: _____

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No N/A
Iinternal standard areas acceptable? ..... Yes No N/A
Internal standard retention times acceptable? ..... Yes No N/A
Standards traceable? ..... Yes No N/A
Standards expired? ..... Yes No N/A
Transcription/calculation errors? ..... Yes No N/A
Comments: _____

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... Yes No N/A
Sample holding times acceptable? ..... Yes No N/A
Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes	No	N/A
Compound quantitation acceptable? (Levels D, E)	Yes	No	N/A
Results reported for all requested analyses?	Yes	No	N/A
Results supported in the raw data? (Levels D, E)	Yes	No	N/A
Samples properly prepared? (Levels D, E)	Yes	No	N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes	No	N/A
Detection limits meet RDL?	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments: 16 over

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes	No	N/A
GPC check performed?	Yes	No	N/A
GPC check recoveries acceptable?	Yes	No	N/A
GPC calibration performed?	Yes	No	N/A
GPC calibration check performed?	Yes	No	N/A
GPC calibration check retention times acceptable?	Yes	No	N/A
Check/calibration materials traceable?	Yes	No	N/A
Check/calibration materials Expired?	Yes	No	N/A
Analytical batch QC given similar cleanup?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments:

Date: 6 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Sites 1607-F-3/1607-F-5
Subject: PCB/Pesticide - Data Package No. K0262-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0262 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
J11L17	3/20/06	Soil	C	See note 1
J11L18	3/20/06	Soil	C	See note 1

1 – PCBs by 8082 & pesticides by 8081.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

- **Method Blank**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than required quantitation limit (RQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than RQL, the result is qualified as undetected and elevated to the RQL.

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike & Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data . The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to the lack of a matrix spike, matrix spike duplicate or LCS analysis, all toxaphene results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows

have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to the lack of a matrix spike and matrix spike duplicate analysis, all toxaphene results were qualified as estimates and flagged "J".

All other precision results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All results met the RQL.

- **Completeness**

Data Package No. K0262 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiency was noted:

- Due to the lack of a matrix spike, matrix spike duplicate or LCS analysis, all toxaphene results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

PESTICIDE/PCB DATA QUALIFICATION SUMMARY*

SDG: K0262	REVIEWER: TLL	Project: 1607-F-5 1607-F-8	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Toxaphene	J	All	No MS/MSD/LCS analysis

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

PCB/PESTICIDE ANALYSIS, SOIL MATRIX, (UG/KG)

Project: WASHINGTON CLOSURE HANFORD					
Laboratory: LLI	SDG: K0262				
Sample Number		J11L17		J11L18	
Remarks					
Sample Date		3/20/06		3/20/06	
Extraction Date		3/23/06		3/23/06	
Analysis Date		3/28/06		3/28/06	
PCB	RQL	Result	Q	Result	Q
Aroclor-1016	100	14	U	14	U
Aroclor-1221	100	14	U	14	U
Aroclor-1232	100	14	U	14	U
Aroclor-1242	100	14	U	14	U
Aroclor-1248	100	14	U	14	U
Aroclor-1254	100	3.4		5.5	
Aroclor-1260	100	14	U	14	U
Sample Number		J11L17		J11L18	
Remarks					
Sample Date		3/20/06		3/20/06	
Extraction Date		3/23/06		3/23/06	
Analysis Date		3/28/06		3/28/06	
Pesticide	RQL	Result	Q	Result	Q
Alpha-BHC	5	0.35	U	0.35	U
Gamma-BHC (Lindane)	5	0.35	U	0.35	U
Beta-BHC	5	0.35	U	1.6	
Heptachlor	5	0.35	U	0.35	U
Delta-BHC	5	0.35	U	0.35	U
Aldrin	5	0.35	U	0.35	U
Heptachlor Epoxide	5	0.35	U	0.35	U
gamma-Chlordane	5	0.83		0.35	U
Endosulfan I	5	0.35	U	0.60	
alpha-Chlordane	5	0.35	U	0.35	U
4,4'-DDE	5	0.49		1.8	
Dieldrin	5	0.35	U	0.35	U
Endrin	5	0.35	U	0.35	U
4,4'-DDD	5	0.35	U	0.35	U
Endosulfan II	5	0.35	U	0.35	U
4,4'-DDT	5	0.35		0.35	U
Endrin Aldehyde	5	0.35	U	1.5	
Endosulfan sulfate	5	0.35	U	0.35	U
Methoxyclor	5	0.35	U	0.35	U
Endrin Ketone	5	0.35	U	0.35	U
Toxaphene	5	3.5	UJ	3.5	UJ

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

PCBs by GC

Report Date: 04/15/06 09:16

RFW Batch Number: 0603L573 Client: TNUHANFORD RC-032 K0262 Work Order: 11343606001 Page: 1

	Cust ID:	J11L17	J11L17	J11L17	J11L18	PBLKDX	PBLKDX BS
Sample Information	RFW#:	001	001 MS	001 MSD	002	06LE0226-MB1	06LE0226-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	111 %	115 %	122 * %	117 %	115 %	108 %
	Decachlorobiphenyl	110 %	118 %	121 %	112 %	116 %	111 %
Aroclor-1016		14 U	112 %	122 %	14 U	13 U	103 %
Aroclor-1221		14 U	14 U	14 U	14 U	13 U	13 U
Aroclor-1232		14 U	14 U	14 U	14 U	13 U	13 U
Aroclor-1242		14 U	14 U	14 U	14 U	13 U	13 U
Aroclor-1248		14 U	14 U	14 U	14 U	13 U	13 U
Aroclor-1254		3.4 J	I	I	5.5 J	13 U	13 U
Aroclor-1260		14 U	111 %	117 %	14 U	13 U	109 %

0000011

6/4/06

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Pesticide/PCBs by GC, CLP List

RFW Batch Number: 0603L573 Client: TNUHANFORD RC-032 K0262 Work Order: 11343606001 Page: 1

Report Date: 04/06/06 12:09

	Cust ID:	J11L17	J11L17	J11L17	J11L18	PBLKDX	PBLKDX BS
Sample Information	RFW#:	001	001 MS	001 MSD	002	06LE0226-MB1	06LE0226-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	97 %	103 %	100 %	103 %	105 %	95 %
	Decachlorobiphenyl	102 %	106 %	108 %	105 %	108 %	106 %
		fl	fl	fl	fl	fl	fl
Alpha-BHC		0.35 U	90 %	93 %	0.35 U	0.33 U	83 %
gamma-BHC (Lindane)		0.35 U	99 %	103 %	0.35 U	0.33 U	93 %
Beta-BHC		0.35 U	98 %	103 %	1.6 J	0.33 U	90 %
Heptachlor		0.35 U	99 %	103 %	0.35 U	0.33 U	92 %
Delta-BHC		0.35 U	84 %	89 %	0.35 U	0.33 U	79 %
Aldrin		0.35 U	100 %	104 %	0.35 U	0.33 U	94 %
Heptachlor epoxide		0.35 U	98 %	103 %	0.35 U	0.33 U	94 %
gamma-Chlordane		0.83 J	98 %	103 %	0.35 U	0.33 U	94 %
Endosulfan I		0.35 U	102 %	106 %	0.60 J	0.33 U	98 %
alpha-Chlordane		0.35 U	97 %	102 %	0.35 U	0.33 U	94 %
4,4'-DDE		0.49 J	106 %	111 %	1.8	0.33 U	100 %
Dieldrin		0.35 U	103 %	108 %	0.35 U	0.33 U	99 %
Endrin		0.35 U	113 %	119 %	0.35 U	0.33 U	101 %
4,4'-DDD		0.35 U	115 %	120 %	0.35 U	0.33 U	107 %
Endosulfan II		0.35 U	102 %	107 %	0.35 U	0.33 U	100 %
4,4'-DDT		0.35 J	104 %	110 %	1.5 J	0.33 U	95 %
Endrin aldehyde		0.35 U	94 %	98 %	0.35 U	0.33 U	92 %
Endosulfan sulfate		0.35 U	106 %	110 %	0.35 U	0.33 U	101 %
Methoxychlor		0.35 U	115 %	121 %	0.35 U	0.33 U	102 %
Endrin ketone		0.35 U	105 %	110 %	0.35 U	0.33 U	103 %
Toxaphene		3.5 U J	3.5 U	3.5 U	3.5 U J	3.3 U	3.3 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

6/4/06

4/10/06

0000000005

0000012

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-032
LVL #: 0603L573
SDG/SAF # K0262/RC-032

W.O. #: 11343-606-001-9999-00
Date Received: 03-22-2006

PCB

Two (2) soil samples were collected on 03-20-2006.

The samples and their associated QC samples were extracted on 03-23-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 03-28-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.

2. Samples were extracted and analyzed within required holding time.

3. The samples and their associated QC samples received Copper-Sulfur and Sulfuric Acid cleanups according to Lionville Laboratory SOPs based on SW846 methods 3660A and 3665A respectively.

4. The method blank was below the reporting limits for all target compounds.

5. One (1) of twelve (12) surrogate recoveries were outside acceptance criteria. However the surrogate recovery acceptance criteria were met (i.e. no more than one outlier per samples).

6. The blank spike recoveries were within acceptance criteria.

7. All matrix spike recoveries were within acceptance criteria.

8. The initial calibrations associated with this data set were within acceptance criteria.

9. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

208 Welsh Pool Road • Exton, PA 19341- 1313 • (610) 280-3000 • Fax (610) 280-3041

10. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.

11. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

4/18/06
Date

kim\r:\group\data\pest\tnu hanford\0603-573.pcbs

LVLI
LIONVILLE LABORATORY INC.

LIONVILLE LABORATORY INC.

Case Narrative

Client: TNU-HANFORD RC-032
LVL #: 0603L573
SDG/SAF # K0262/RC-032

W.O. #: 11343-606-001-9999-00
Date Received: 03-22-2006

CHLORINATED PESTICIDES

Two (2) soil samples were collected on 03-20-2006.

The samples and their associated QC samples were extracted on 03-23-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 03-29-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8081A.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance.

2. Samples were extracted and analyzed within required holding time.

3. The samples and their associated QC samples received a Copper-Sulfur cleanup according to Lionville Laboratory SOPs based on SW846 method 3660A.

4. The method blank was below the reporting limits for all target compounds.

5. All surrogate recoveries were within acceptance criteria.

6. All blank spike recoveries were within acceptance criteria.

7. All matrix spike recoveries were within acceptance criteria.

8. The initial calibrations associated with this data set were within acceptance criteria.

9. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

208 Welsh Pool Road • Exton, PA 19341- 1313 • (610) 280-3000 • Fax (610) 280-3041

LIONVILLE LABORATORY INC.

10. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.

11. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

4/13/16
Date

som\r:\group\data\pest\tnu hanford\0603-573s.pst

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Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-027	Page 1 of 1

Collector: Coffman	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH	Price Code: 8K	Data Turnaround: 15 DAY
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 1607-F-3 Stock pile Area Verification		SAF No.: RC-032	Air Quality ☐	
Ice Chest No.: ERC-99-062	Field Logbook No.: EFL-1174-1	COA 3 R607FS2000 RTC 3/16/06	Method of Shipment: Fed Ex		
Shipped To: EBERLINE SERVICES LIONVILLE	Offsite Property No.: A060338		Bill of Lading/Air Bill No.: SEE OSAC		

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

L.D.O.T. Limits

Special Handling and/or Storage

Cool 4 degrees C

SAMPLE ANALYSIS												
Preservation			None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None				
Type of Container			aG	aG	aG	aG	aG	G/P				
No. of Container(s)			1	1	1	1	1	1				
Volume			250g	60mL	120mL	120mL	125mL	100mL				
			See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081	See item (2) in Special Instructions. RTC 3/20/06				
Sample No.	Matrix *	Sample Date	Sample Time									
J11L17	SOIL	3/20/06	1230	X	X	X	X	X				

000017

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
RT Coffman / RT Coffman	3/20/06 1500	Reser #2A, 3728	3/20/06 1500
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
3728 #2A 3-21-06	0900	TR Edmondson TR Edmondson	3-21-06 0900
Relinquished By/Removed From WCH	Date/Time 1600	Received By/Stored In	Date/Time
TR Edmondson TR Edmondson	3-21-06	FED EX	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Fed Ex	3-22-06 0920	V. Hennig	3-22-06 0920
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010 (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7470 - (CV)
(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Silver-108 metastable}

Personnel not available to relinquish samples from 3728 Ref # 2A on 3.12.06

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquid
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-028	Page 1 of 1

Collector: Coffman	Company Contact: R.T. Coffman	Telephone No.: 528-6409	Project Coordinator: KESSNER, JH	Price Code: 8K	Data Turnaround: 15 DAY
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 1607-F-5 Stock pile Area Verification		SAF No.: RC-032	Air Quality ☐	
Ice Chest No.: ERC-99-062	Field Logbook No.: EFL-1174-1	COA: R607F52000	Method of Shipment: Fed Ex		
Shipped To: EBERLINE SERVICES / LIONVILLE	Offsite Property No.: A060338		Bill of Lading/Air Bill No.: SEE OSPC.		

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

< D.O.T. Limits

Special Handling and/or Storage

Cool 4 degrees C

SAMPLE ANALYSIS												
Preservation	None	Cool 4C	Cool 4C	Cool 4C								
Type of Container	aG	aG	aG	aG								
No. of Container(s)	1	1	1	1								
Volume	250g	60mL	120mL	125mL								
	See Item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)	Pesticides - 8081								
Sample No.	Matrix *	Sample Date	Sample Time									
J11L18	SOIL	3/20/06	1100	X	X	X	X					

010018

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: R COFFMAN / RT Coffman	Date/Time: 1500 3/24/06	Received By/Stored In: Reece # 2A 3728	Date/Time: 1500 3/24/06
Relinquished By/Removed From: 3728 #2A	Date/Time: 3-21-06 0900	Received By/Stored In: TR. Edmundson R Edmundson 3-21-06	Date/Time: 0900
Relinquished By/Removed From: WCH T.R. Edmundson R Edmundson 3-21-06	Date/Time: 1500	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: Fed Ex	Date/Time: 3-22-06 0900	Received By/Stored In: V. Newman 3-22-06	Date/Time: 0900
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010 (Client List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7470 - (CV)

Relinquish samples from 3728
Ref # 2A on 3 21 106

Matrix *
S=Soil
SE=Sediment
SD=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

Appendix 5

Data Validation Supporting Documentation

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 1607-F-3/1607-F-5			DATA PACKAGE: K0262		
VALIDATOR: TCI		LAB: LLI		DATE: 6/2/06	
			SDG: K0262		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
J11L17 J11L18					
Soil					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable? ..... Yes No N/A

Continuing calibrations acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

DDT and endrin breakdowns acceptable? ..... Yes No N/A

Comments: _____

PCB DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No (N/A)
Calibration blank results acceptable? (Levels D, E) ..... Yes No (N/A)
Laboratory blanks analyzed? ..... (Yes) No N/A
Laboratory blank results acceptable? ..... (Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E) ..... Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: no Eq

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed? ..... (Yes) No N/A
Surrogate recoveries acceptable? ..... (Yes) No N/A
Surrogates traceable? (Levels D, E) ..... Yes No (N/A)
Surrogates expired? (Levels D, E) ..... Yes No (N/A)
MS/MSD samples analyzed? ..... (Yes) No N/A
MS/MSD results acceptable? ..... (Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)
LCS/BSS samples analyzed? ..... (Yes) No N/A
LCS/BSS results acceptable? ..... (Yes) No N/A
Standards traceable? (Levels D, E) ..... Yes No (N/A)
Standards expired? (Levels D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Performance audit sample(s) analyzed? ..... Yes (No) N/A
Performance audit sample results acceptable? ..... Yes No (N/A)
Comments: no toxaphene MS/MSD/LCS - J all

PCB DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... (Yes) No N/A
Duplicate results acceptable? ..... (Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)
Field duplicate RPD values acceptable? ..... Yes No (N/A)
Field split RPD values acceptable? ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: No toxaphene MS/MSD — Jaly

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable? ..... Yes No (N/A)
Positive results resolved acceptably? ..... Yes No (N/A)
Comments:

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... (Yes) No N/A
Sample holding times acceptable? ..... (Yes) No N/A
Comments:

PCB DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes	No	N/A
Compound quantitation acceptable? (Levels D, E)	Yes	No	N/A
Results reported for all requested analyses?	Yes	No	N/A
Results supported in the raw data? (Levels D, E)	Yes	No	N/A
Samples properly prepared? (Levels D, E)	Yes	No	N/A
Detection limits meet RDL?	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments: _____

9. SAMPLE CLEANUP (Levels D and E)

Fluoricil ® (or other absorbent) cleanup performed?	Yes	No	N/A
Lot check performed?	Yes	No	N/A
Check recoveries acceptable?	Yes	No	N/A
GPC cleanup performed?	Yes	No	N/A
GPC check performed?	Yes	No	N/A
GPC check recoveries acceptable?	Yes	No	N/A
GPC calibration performed?	Yes	No	N/A
GPC calibration check performed?	Yes	No	N/A
GPC calibration check retention times acceptable?	Yes	No	N/A
Check/calibration materials traceable?	Yes	No	N/A
Check/calibration materials Expired?	Yes	No	N/A
Analytical batch QC given similar cleanup?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments: _____

Date: 6 June 2006
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100-F Remaining Sites Burial Grounds – Soil Full Protocol - Waste Sites 1607-F-3/1607-F-5
Subject: Inorganics - Data Package No. K0262-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0262 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Matrix	Validation	Date
J11L17	3/20/06	Soil	C	See note 1
J11L18	3/20/06	Soil	C	See note 1

1 - ICP metals (6010B) and mercury (7471A).

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for mercury and 6 months for ICP metals.

All holding times were acceptable.

· **Preparation (Method) Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis

· **Accuracy**

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to an LCS recovery outside QC limits (23.5%), all silicon results were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (54.3%), all antimony results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD outside QC limits (33.7%), all barium results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All results met the RQL.

- **Completeness**

Data package No. K0262 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to an LCS recovery outside QC limits (23.5%), all silicon results were qualified as estimates and flagged "J".
- Due to a matrix spike recovery outside QC limits (54.3%), all antimony results were qualified as estimates and flagged "J".
- Due to an RPD outside QC limits (33.7%), all barium results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

METALS DATA QUALIFICATION SUMMARY*

SDG: K0262	REVIEWER: [illegible]	Project: 1607-F-3 1607-F-5	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony	J	All	MS recovery
Silicon	J	All	LCS recovery
Barium	J	All	RPD

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHINGTON CLOSURE HANFORD							
Lab: LLI	SDG: K0262						
Sample Number		J11L17		J11L18			
Remarks							
Sample Date		3/20/06		3/20/06			
Inorganics	RQL	Result	Q	Result	Q	Result	Q
Silver	0.2	0.07	U	0.07	U		
Aluminum		5460		5450			
Arsenic	10	12.1		2.8			
Boron		1.7		3.0			
Barium	2	60.2	J	69.7	J		
Beryllium		0.02		0.09			
Calcium		4180		5730			
Cadmium	0.2	0.27		0.33			
Cobalt		5.2		5.1			
Chromium	1	9.4		8.6			
Copper		14.5		12.6			
Iron		13000		12700			
Mercury	0.2	0.03		0.02	U		
Potassium		1160		1210			
Magnesium		3430		3440			
Manganese		255		239			
Molybdenum		0.29	U	0.31			
Sodium		100		111			
Nickel		9.6		9.3			
Lead	5	54.9		6.9			
Antimony		0.45	UJ	0.45	UJ		
Selenium	1	0.48	U	0.48	U		
Silicon		630	J	530	J		
Vanadium		28.2		29.0			
Zinc	1	38.4		35.3			

000070

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/03/06

CLIENT: TNUHANFORD RC-032 K0262 LVL LOT #: 0603L573

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	J11L17	Silver, Total	0.07 u	MG/KG	0.07	1.0
		Aluminum, Total	5460	MG/KG	2.9	1.0
		Arsenic, Total	12.1	MG/KG	0.62	1.0
		Boron, Total	1.7	MG/KG	0.24	1.0
		Barium, Total	60.2 J	MG/KG	0.02	1.0
		Beryllium, Total	0.02	MG/KG	0.02	1.0
		Calcium, Total	4180	MG/KG	1.7	1.0
		Cadmium, Total	0.27	MG/KG	0.07	1.0
		Cobalt, Total	5.2	MG/KG	0.14	1.0
		Chromium, Total	9.4	MG/KG	0.13	1.0
		Copper, Total	14.5	MG/KG	0.12	1.0
		Iron, Total	13000	MG/KG	3.5	1.0
		Mercury, Total	0.03	MG/KG	0.02	1.0
		Potassium, Total	1160	MG/KG	2.3	1.0
		Magnesium, Total	3430	MG/KG	0.98	1.0
		Manganese, Total	255	MG/KG	0.03	1.0
		Molybdenum, Total	0.29 u	MG/KG	0.29	1.0
		Sodium, Total	100	MG/KG	0.77	1.0
		Nickel, Total	9.6	MG/KG	0.24	1.0
		Lead, Total	54.9	MG/KG	0.31	1.0
		Antimony, Total	0.45 u J	MG/KG	0.45	1.0
		Selenium, Total	0.48 u	MG/KG	0.48	1.0
		Silicon, Total	630 J	MG/KG	2.3	1.0
		Vanadium, Total	28.2	MG/KG	0.09	1.0
		Zinc, Total	38.4	MG/KG	0.16	1.0

6/4/06

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 04/03/06

CLIENT: TNUHANFORD RC-032 K0262 LVL LOT #: 0603L573

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	J11L18	Silver, Total	0.07 u	MG/KG	0.07	1.0
		Aluminum, Total	5450	MG/KG	2.9	1.0
		Arsenic, Total	2.8	MG/KG	0.62	1.0
		Boron, Total	3.0	MG/KG	0.25	1.0
		Barium, Total	69.7 J	MG/KG	0.02	1.0
		Beryllium, Total	0.09	MG/KG	0.02	1.0
		Calcium, Total	5730	MG/KG	1.7	1.0
		Cadmium, Total	0.33	MG/KG	0.07	1.0
		Cobalt, Total	5.1	MG/KG	0.14	1.0
		Chromium, Total	8.6	MG/KG	0.13	1.0
		Copper, Total	12.6	MG/KG	0.12	1.0
		Iron, Total	12700	MG/KG	3.6	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	1210	MG/KG	2.3	1.0
		Magnesium, Total	3440	MG/KG	0.99	1.0
		Manganese, Total	239	MG/KG	0.03	1.0
		Molybdenum, Total	0.31	MG/KG	0.30	1.0
		Sodium, Total	111	MG/KG	0.78	1.0
		Nickel, Total	9.3	MG/KG	0.25	1.0
		Lead, Total	6.9	MG/KG	0.32	1.0
		Antimony, Total	0.45 uJ	MG/KG	0.45	1.0
		Selenium, Total	0.48 u	MG/KG	0.48	1.0
		Silicon, Total	530 J	MG/KG	2.3	1.0
		Vanadium, Total	29.0	MG/KG	0.09	1.0
		Zinc, Total	35.3	MG/KG	0.16	1.0

4/4/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD RC-032
LVL#: 0603L573
SDG/SAF#: K0262/RC-032

W.O.#: 11343-606-001-9999-00
Date Received: 03-22-06

METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 soil samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. The preparation/method blank for 1 analyte was outside method criteria. {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

   a). The MB result for Silver was greater than the Practical Quantitation Limit (PQL) {3 x the (IDL) Instrument Detection Level}, however, all samples read less than the IDL.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silicon at 23.5%. Refer to the Inorganics Laboratory Control Standards Report. Associated sample results may be biased low.

10. The matrix spike (MS) recoveries for 4 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial

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dilution are performed. A PDS was prepared at meaningful concentration level for the following analytes:

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
J11L17	Aluminum	12,000	89.7
	Iron	22,000	83.4
	Antimony	100	93.3
	Silicon	2,100	92.7

12. The duplicate analyses for 2 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

14. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.

15. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

4/6/06
Date

jjw/m03-573

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-027	Page 1 of 1

Collector: Coffman	Company Contact: R.T. Coffman — Telephone No.: 528-6409	Project Coordinator: KESSNER, JH	Price Code: 8K — Data Turnaround: 15 DAY
Project Designation: 100-F Remaining Sites Burial Grounds - Soil Full Protocol	Sampling Location: 1607-F-3 Stock pile Area Verification	SAF No.: RC-032	Air Quality ☐
Ice Chest No.: ERC-99-062	Field Logbook No.: EFL-1174-1 — COA: 3 R607F52000 RTC 3/16/06	Method of Shipment: Fed Ex	
Shipped To: EBERLINE SERVICES LIONVILLE	Offsite Property No.: A060338	Bill of Lading/Air Bill No.: SEE OSR	

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

L.D.O.T. Limits

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None				
Type of Container	aG	aG	aG	aG	aG	G/P				
No. of Container(s)	1	1	1	1	1	1				
Volume	250g	60mL	120mL	120mL	125mL	500mL				

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)	VOA - 8260A (TCL)	Pesticides - 8081	See item (2) in Special Instructions. RTC 3/20/06				
J11L17	SOIL	3/20/06	1230	X	X	X	X	X	X				

0000016

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
RT Coffman / RT Coffman 3/20/06	1500	ROER #2A, 3728	3/20/06 1500
3728 #2A 3-21-06	0900	T.R. Edmundson TR Edmundson 3-21-06	0900
T.R. Edmundson TR Edmundson 3-21-06	WCH 1600	FED EX	
Fed Ex	3-22-06 0920	[illegible]	3-22-06 0920

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010 (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7470 - (CV)
(2) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Silver-108 metastable}

Personnel not available to relinquish samples from 3728 Ref # 2A on 3/21/06

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquid
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-032-028	Page 1 of 1

Collector Coffman	**Company Contact** R.T. Coffman	**Telephone No.** 528-6409	**Project Coordinator** KESSNER, JH	**Price Code** 8K	**Data Turnaround**
Project Designation 100-F Remaining Sites Burial Grounds - Soil Full Protocol	**Sampling Location** 1607-F-5 Stock pile Area Verification		**SAF No.** RC-032	**Air Quality** ☐	15 Day
Ice Chest No. ERC-99-062	**Field Logbook No.** EFL-1174-1	**COA** R607F52000	**Method of Shipment** Fed Ex		
Shipped To EBERLINE SERVICES / LIONVILLE	**Offsite Property No.** A060338		**Bill of Lading/Air Bill No.** SEE OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

< D.O.T. Limits

Special Handling and/or Storage

Cool 4 degrees C

Preservation	None	Cool 4C	Cool 4C	Cool 4C						
Type of Container	sG	sG	sG	sG						
No. of Container(s)	1	1	1	1						
Volume	250g	60mL	120mL	125mL						

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions.	PCBs - 8082	Semi-VOA - 8270A (TCL)	Pesticides - 8081						
J11L18	SOIL	3/20/06	1100	X	X	X	X						

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time 1500	Received By/Stored In	Date/Time 1500
R Coffman / RTCoffman 3/20/06		Refer #2A, 3228	3/20/06
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time 0900
3728 #2A	3-21-06 0900	TR. Edmundson TREdmundson	3-21-06
Relinquished By/Removed From WCH	Date/Time 1500	Received By/Stored In	Date/Time
T.R. Edmundson TREdmundson	3-21-06	FED EX	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Fed Ex	3-22-06 0900	V. Newman	3-22-06 0900
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010 (Client List) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc}; Mercury - 7470 - (CV)

Relinquish samples from 3728
Ref # 2A on 3/21/06

Matrix *
SoSoil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: RCBRA 1607-F-3/1607-F-5			DATA PACKAGE: K0262		
VALIDATOR: TLI		LAB: LLI		DATE: 5/31/06	
			SDG: K0262		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J11L17 J11L18					
				Soil	

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No (N/A)

Initial calibrations acceptable? ..... Yes No (N/A)

ICP interference checks acceptable? ..... Yes No (N/A)

ICV and CCV checks performed on all instruments? ..... Yes No (N/A)

ICV and CCV checks acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Calculation check acceptable? ..... Yes No (N/A)

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E) ..... Yes No (N/A)
Laboratory blanks analyzed? ..... (Yes) No N/A
Laboratory blank results acceptable? ..... (Yes) No N/A
Field blanks analyzed? (Levels C, D, E) ..... Yes (No) N/A
Field blank results acceptable? (Levels C, D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: _____

4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed? ..... (Yes) No N/A
MS/MSD results acceptable? ..... Yes (No) N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)
LCS/BSS samples analyzed? ..... (Yes) No N/A
LCS/BSS results acceptable? ..... Yes (No) N/A
Standards traceable? (Levels D, E) ..... Yes No (N/A)
Standards expired? (Levels D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Performance audit sample(s) analyzed? ..... Yes (No) N/A
Performance audit sample results acceptable? ..... Yes No (N/A)

Comments: no PAS
Antimony 54.3% MS - J all
Silicon 23.5% LCS - J all

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes	(No)	N/A
Duplicate results acceptable?	Yes	(No)	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
MS/MSD standards expired? (Levels D, E)	Yes	No	(N/A)
Field duplicate RPD values acceptable?	Yes	No	(N/A)
Field split RPD values acceptable?	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)

Comments: Barium RPD 33.7% - J qlf

6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed?	Yes	No	(N/A)
ICP serial dilution %D values acceptable?	Yes	No	(N/A)
ICP post digestion spike required?	Yes	No	(N/A)
ICP post digestion spike values acceptable?	Yes	No	(N/A)
Standards traceable?	Yes	No	(N/A)
Standards expired?	Yes	No	(N/A)
Transcription/calculation errors?	Yes	No	(N/A)

Comments:

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

7. FURNACE AA QUALITY CONTROL (Levels D and E)

Duplicate injections performed as required?	Yes	No	N/A
Duplicate injection %RSD values acceptable?	Yes	No	N/A
Analytical spikes performed as required?	Yes	No	N/A
Analytical spike recoveries acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
MSA performed as required?	Yes	No	N/A
MSA results acceptable?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	N/A

Comments:_____

8. HOLDING TIMES (all levels)

Samples properly preserved?	Yes	No	N/A
Sample holding times acceptable?	Yes	No	N/A

Comments:_____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... (Yes) No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No (N/A)

Samples properly prepared? (Levels D, E) ..... Yes No (N/A)

Detection limits meet RDL? ..... (Yes) No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: _____

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/03/06

CLIENT: TNUHANFORD RC-032 K0262 LVL LOT #: 0603L573

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	06L0184-MB1	Silver, Total	0.31	MG/KG	0.07	1.0
		Aluminum, Total	5.2	MG/KG	2.9	1.0
		Arsenic, Total	0.61 u	MG/KG	0.61	1.0
		Boron, Total	0.28	MG/KG	0.24	1.0
		Barium, Total	0.33	MG/KG	0.02	1.0
		Beryllium, Total	0.02 u	MG/KG	0.02	1.0
		Calcium, Total	1.6 u	MG/KG	1.6	1.0
		Cadmium, Total	0.07 u	MG/KG	0.07	1.0
		Cobalt, Total	0.14 u	MG/KG	0.14	1.0
		Chromium, Total	0.13 u	MG/KG	0.13	1.0
		Copper, Total	0.12 u	MG/KG	0.12	1.0
		Iron, Total	3.8	MG/KG	3.5	1.0
		Potassium, Total	3.8	MG/KG	2.3	1.0
		Magnesium, Total	0.97 u	MG/KG	0.97	1.0
		Manganese, Total	0.03 u	MG/KG	0.03	1.0
		Molybdenum, Total	0.29 u	MG/KG	0.29	1.0
		Sodium, Total	1.1	MG/KG	0.76	1.0
		Nickel, Total	0.24 u	MG/KG	0.24	1.0
		Lead, Total	0.31 u	MG/KG	0.31	1.0
		Antimony, Total	0.44 u	MG/KG	0.44	1.0
		Selenium, Total	0.62	MG/KG	0.47	1.0
		Silicon, Total	2.3 u	MG/KG	2.3	1.0
		Vanadium, Total	0.09 u	MG/KG	0.09	1.0
		Zinc, Total	0.16 u	MG/KG	0.16	1.0
BLANK1	06C0055-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 04/03/06

CLIENT: TNUHANFORD RC-032 K0262 LVL LOT #: 0603L573

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	J11L17	Silver, Total	4.5	0.07u	5.1	88.2	1.0
		Aluminum, Total	5950	5460	202	242.7*	1.0
		Arsenic, Total	182	12.1	202	83.9	1.0
		Boron, Total	82.1	1.7	101	79.4	1.0
		Barium, Total	246	60.2	202	91.7	1.0
		Beryllium, Total	4.8	0.02	5.1	93.6	1.0
		Calcium, Total	6550	4180	2530	93.8	1.0
		Cadmium, Total	4.8	0.27	5.1	88.8	1.0
		Cobalt, Total	51.6	5.2	50.6	91.7	1.0
		Chromium, Total	28.1	9.4	20.2	92.6	1.0
		Copper, Total	38.9	14.5	25.3	96.4	1.0
		Iron, Total	12200	13000	101	-720. *	1.0
		Mercury, Total	0.22	0.03	0.16	121.5	1.0
		Potassium, Total	3380	1160	2530	87.6	1.0
		Magnesium, Total	5690	3430	2530	89.1	1.0
		Manganese, Total	300	255	50.6	87.5*	1.0
		Molybdenum, Total	91.8	0.29u	101	90.7	1.0
		Sodium, Total	2420	100	2530	91.5	1.0
		Nickel, Total	55.7	9.6	50.6	91.1	1.0
		Lead, Total	97.7	54.9	50.6	84.6	1.0
		Antimony, Total	27.5	0.45u	50.6	54.3	1.0
		Selenium, Total	165	0.48u	202	81.6	1.0
		Silicon, Total	988	630	101	353.7*	1.0
		Vanadium, Total	72.3	28.2	50.6	87.2	1.0
		Zinc, Total	80.4	38.4	50.6	83.0	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 04/03/06

CLIENT: TNUHANFORD RC-032 K0262 LVL LOT #: 0603L573

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	J11L17	Silver, Total	0.07u	0.07u	NC	1.0
		Aluminum, Total	5460	5460	0.14	1.0
		Arsenic, Total	12.1	12.1	0.00	1.0
		Boron, Total	1.7	1.7	0.00	1.0
		Barium, Total	60.2	84.6	33.7	1.0
		Beryllium, Total	0.02	0.07	92.1	1.0
		Calcium, Total	4180	4060	3.0	1.0
		Cadmium, Total	0.27	0.33	18.5	1.0
		Cobalt, Total	5.2	5.1	1.9	1.0
		Chromium, Total	9.4	11.4	19.2	1.0
		Copper, Total	14.5	15.2	4.7	1.0
		Iron, Total	13000	12500	3.7	1.0
		Mercury, Total	0.03	0.03	10.5	1.0
		Potassium, Total	1160	1160	0.21	1.0
		Magnesium, Total	3430	3420	0.48	1.0
		Manganese, Total	255	253	0.98	1.0
		Molybdenum, Total	0.29u	0.29u	NC	1.0
		Sodium, Total	100	99.3	0.70	1.0
		Nickel, Total	9.6	9.5	1.0	1.0
		Lead, Total	54.9	55.7	1.4	1.0
		Antimony, Total	0.45u	0.45u	NC	1.0
		Selenium, Total	0.48u	0.48u	NC	1.0
		Silicon, Total	630	595	5.7	1.0
		Vanadium, Total	28.2	27.0	4.3	1.0
		Zinc, Total	38.4	44.2	14.0	1.0

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 04/03/06

CLIENT: TNUHANFORD RC-032 K0262 LVL LOT #: 0603L573

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	06L0184-LC1	Silver, LCS	47.0	50.0	MG/KG	94.0
		Aluminum, LCS	495	500	MG/KG	99.0
		Arsenic, LCS	886	1000	MG/KG	88.6
		Boron, LCS	454	500	MG/KG	90.7
		Barium, LCS	500	500	MG/KG	100.0
		Beryllium, LCS	23.2	25.0	MG/KG	92.8
		Calcium, LCS	2290	2500	MG/KG	91.6
		Cadmium, LCS	22.6	25.0	MG/KG	90.4
		Cobalt, LCS	229	250	MG/KG	91.6
		Chromium, LCS	46.7	50.0	MG/KG	93.4
		Copper, LCS	126	125	MG/KG	101.1
		Iron, LCS	470	500	MG/KG	94.0
		Potassium, LCS	2500	2500	MG/KG	99.9
		Magnesium, LCS	2330	2500	MG/KG	93.2
		Manganese, LCS	72.8	75.0	MG/KG	97.1
		Molybdenum, LCS	473	500	MG/KG	94.6
		Sodium, LCS	2380	2500	MG/KG	95.4
		Nickel, LCS	185	200	MG/KG	92.4
		Lead, LCS	229	250	MG/KG	91.6
		Antimony, LCS	283	300	MG/KG	94.4
		Selenium, LCS	873	1000	MG/KG	87.3
		Silicon, LCS	117	500	MG/KG	23.5
		Vanadium, LCS	238	250	MG/KG	95.0
		Zinc, LCS	89.3	100	MG/KG	89.3
LCS1	06C0055-LC1	Mercury, LCS	6.9	6.2	MG/KG	111.1